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CIRCUIT PROTECTION DEVICE WITH GROUNDED NEUTRAL HALF

CYCLE SELF TEST

CROSS-REFERENCE TO RELATED APPLICATIONS

This is a continuation-in-part of U.S. Patent Application Serial No. 09/725,525, filed on November 29, 2000, ^{now U.S. Patent Number 6,674,282 B2} issued January 6, 2004, the content of which is relied upon and incorporated herein by reference in its entirety, and the benefit of priority under 35 U.S.C. §120 is hereby claimed.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to circuit protection devices, and particularly to self-testing circuit protection devices.

2. Technical Background

Circuit protection devices are configured to interrupt the flow of electrical power to a load circuit when certain fault conditions. Two of the most common types of circuit protection devices are arc-fault circuit interrupters (AFCIs) and ground-fault circuit interrupters (GFCIs). AFCI and GFCI protection may be included together in one protective device.

An arc fault is a discharge of electricity between two or more conductors. An arc fault may be caused by damaged insulation on the hot or neutral line conductors, or both. The damaged insulation may cause a low power arc between the two conductors and fire may result. An AFCI is configured to detect the arcing condition and de-energize the electrical circuit.

A ground fault occurs when a current carrying (hot) conductor contacts ground. This creates an unintended current path that represents an electrical shock hazard. A ground fault creates an unintended current path that may also lead to fire. GFCIs intended to prevent fire have been called ground-fault equipment protectors (GFEPs.)

A ground fault may occur for several reasons. If the wiring insulation within a piece of equipment becomes damaged, a user may contact the hot conductor and ground at the same time, creating a shock hazard for a user. A ground fault may also occur when the equipment comes in contact with water and the user comes in contact with the water. A ground fault may also be caused by damaged insulation within a structure. A GFCI is configured to sense dangerous conditions such as these and respond quickly.